



IMMUNOLOGICAL CHANGES INDUCED BY TOXIC DOSES OF SUSTANON IN MALE RATS TREATED WITH ALPHA LIPOIC ACID

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ABSTRACT

This study was designed to evaluate the immunological effect of anabolic androgenic steroid (sustanon) in male rats treated with alpha lipoic Acid (ALA). For these reason three groups of male rats each group 20 rats were taken. First group (control) had been given 1/M of 1 ml sesame oil weekly for 60 days. 2nd group had been given sustanon with high dose (20mg/kg.b.wt) of sesame oil 1/M, weekly for 60 days. 3rd. group had been given sustanon sesame oil similar to 2nd. Group in addition to alpha lipoic acid 10mg/ 100kg b.wt orally, weekly for 60 days. All these groups were immunized with BCG vaccine 0.1 ml 1/d at first days, 14th day and at 30th and 44th day for remaining rats. The results showed that the control (sesame oil group) had a high level of cellular and humoral immune response at the end of the first and second month of experiment. The 2nd group (sustanon sesame oil group) showed mild cellular and humoral immune response at the end of first and second months. The 3rd group (sustanon – sesame oil) to gather with alpha lipoic acid treated group showed moderate cellular and humoral immune response comparable to control immunized group. Sustanon – sesame oil treated group showed mild cellular and humoral immune response whereas sustanon – sesame oil together with alpha lipoic acid treated group showed moderate level of cellular and humoral immunized group .

KEY WORDS: Immunological changes, sustanon toxicity, alpha lipoic acid.

INTRODUCTION

Testosterone is the male sex cholesterol inferred hormones^[1] created and emitted by interstitial leydig cells^[2]. It manages optional sexual qualities and act to fortify sperm creation^[3]. Sustanon is a one of anabolic androgenic steroids used for treatment of hypogonadism^[4], delay puberty^[5], Micropenis^[6] and other diseases at certain therapeutic doses but treatment with high doses become toxic to the body organs. Alpha lipoic acid is an unsaturated fatty acids derivative that is created in little sums by plants, animals and human^[7].

It was observed to be a co-factor for a number of mitochondrial enzyme groups that are share and included in the production of energy comparable in action to a large portion of the vitamin B complex^[8]. Alpha lipoid acid and their reducing structure, dihydrolipoic acid have numerous anti oxidants properties. The importance of the sustanon toxicity and antioxidant activity of alpha lipoic acid, this study aimed to:

- (1) Identify the immunological changes induced by sustanon toxic doses and
- (2) To identify the role of alpha lipoic acid in reducing the toxic effect of sustanon acting as antioxidant agent.

MATERIALS & METHODS

Three group of male rats (each group 20 rats).

First group (sesame oil control group) treated with 1ml of sesame oil 1/M weekly for 60 days.

2nd group: sustanon – sesame oil group treated with high doses 20mg /Kg.b.wt.1/M weekly for 60 days.

3rd group: sustanon – sesame oil group treated similar to 2nd group in addition to alpha lipoic acid 10mg / 100Kg. b.wt orally weekly for 60 days.

All the three groups were immunized with 0.1ml of BCG 1/d at first day, 14th days and at 30th and 44th day for remaining rats.

At 27th day delayed type hypersensitivity skin test were done and at 30th day passive hemagglutination test were done to check cellular and humoral immune response⁽⁹⁾. For the remaining groups of rats delayed type hypersensitivity skin test and passive hemagglutination test were done at 57th and 60th day respectively.

RESULTS

Cellular immunity

First control immunized group: At 27th day showed extensive variation in skin thickness differences .after 24, 48, 72 hrs with the mean of 1.76 ± 0.022 , 2.03 ± 0.036 and 1.91 ± 0.031 respectively. At the 57th days the remaining group of rats showed extensive variation in skin thickness differences after 24, 48, 72hr with a mean of 1.87 ± 0.020 , 2.12 ± 0.024 and 2.00 ± 0.025 respectively. (Table – 1)

2nd group (sustanon – sesame oil toxic group: At 27th day showed mild variation in the skin thickness differences after 24, 48, 72 hrs with the mean of 1.54 ± 0.016 , 1.63 ± 0.015 and 1.52 ± 0.020 respectively.

At 57th day the remaining group of rats showed mild variation in skin thickness differences after 24, 48, 72 hr

with the mean of 1.61 ± 0.017 , 1.68 ± 0.020 and 1.56 ± 0.016 respectively (Table -1).

TABLE 1: The mean values of the foot pad thickness of the rat (in mm) after 27 days and 57 days post the first inoculation.

Group		Mean \pm SE			
		0hrs	24hrs	48hrs	72hrs
1 st group (control)	27 days period	1.44 \pm 0.016A	1.76 \pm 0.022C	2.03 \pm 0.036D	1.91 \pm 0.031A
	57 days period	1.55 \pm 0.016A	1.87 \pm 0.021C	2.12 \pm 0.024D	2.00 \pm 0.025D
2 nd group	27 days period	1.45 \pm 0.016A	1.54 \pm 0.016A	1.63 \pm 0.015A	1.52 \pm 0.020A
	57 days period	1.54 \pm 0.016A	1.61 \pm 0.017A	1.68 \pm 0.020A	1.56 \pm 0.016A
3 rd group	27 days period	1.44 \pm 0.016A	1.61 \pm 0.023B	1.77 \pm 0.026B	1.65 \pm 0.025A
	57 days period	1.56 \pm 0.016A	1.71 \pm 0.023B	1.85 \pm 0.016B	1.72 \pm 0.020B

The different letters in the vertical refer to significant differences while the similar letters refer to non-significant differences at (p 0.05).

3rd group (sustanon – sesame together with alpha lipoic acid treated group):

At 27th day, this group showed moderate variation in skin thickness differences after 24, 48, 72 hrs with the mean of 1.61 ± 0.023 , 1.77 ± 0.026 and 1.65 ± 0.025 respectively.

At 57th days the remaining group of rats showed moderate variation in skin thickness differences after 24, 48, 72 hrs with the mean of 1.71 ± 0.023 , 1.85 ± 0.016 and 1.72 ± 0.020 respectively (Table -1).

Humoral immunity

First control group: this group showed high level of antibodies at 30th and 60th day of the first inoculation with

the mean of 83.20 ± 9.776 and 108.80 ± 9.776 respectively (Table -2).

2nd group of sustanon – sesame oil toxic group : this group Showed mild variation in the level of antibodies at the 30th and 60th day of first inoculation with mean of 12.00 ± 1.333 and 10.36 ± 0.564 respectively (Table -2)

3rd group (sustanon – sesame oil together with alpha lipoic acid) this group showed moderate variation in the level of antibodies at the 30th and 60th day of first inoculation with the mean of 22.40 ± 2.612 and 16.80 ± 2.784 respectively (Table -2).

TABLE 2: Mean values of antibodies titers in different groups immunized with BCG vaccine at day 30 and day 60 after first inoculation

Mean \pm SE	1 st Group (control)	2 nd Group	3 rd Group
30 days period	83.20 \pm 9.776B	12.00 \pm 1.333A	22.40 \pm 2.612A
60 days period	108.80 \pm 9.776B	10.36 \pm 0.564A	16.8 \pm 2.784A

The different letters refer to significant differences at (p 0.05).

DISCUSSION

The elevation of skin thickness differences in first control group related to immune effect of BCG on immune system of the rats in this group which similarly observed by [10] who found that the level of cellular immunity was elevated in BCG group only, indicating that the BCG a good immune stimulator and enhance cellular immunity in case of 2nd group (toxic group) showed mild variation in skin thickness differences comparable to control group , these results revealed that the toxic dose of sustanon cause suppressor effect on cellular immunity which explained by [11] that the androgen derivatives at high doses suppress cellular immunity by accelerating thymocytes apoptosis which is evident in this study through lymphoid depletion in the rat spleen. Moderate skin thickness differences recorded in toxic group mean that the lipoic acid modulate and decrease the effect of sustanon toxicity. So moderate elevation in cellular immunity detected by moderate skin thickness differences which observed in this study a similar observation of [12]. This observation was evidenced in this study through mild reactive hyperplasia in spleen and peribronchial lymphoid tissue. Regarding humoral immunity, high level of antibodies detected in the first

control group due to high immune response to the BCG vaccination, a similar findings have been reported by [13]. Low level of antibodies in the 2nd group (Toxic – sustanon group) indicating that high doses of sustanon have toxic effects on humoral immunity a similar finding observed by [14] who found that high doses of androgens have an adverse effect on humoral immunity. In case of toxic – sustanon and alpha lipoic acid group, moderate level of antibodies comparable to 2nd toxic – sustanon alone group, indicated that the alpha lipoic acid reduce and modulate the toxic effect of sustanon, a similar findings observed by [12] that the alpha lipoic acid modulated and recruit both arms of immunity.

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